
From: Ben Grunewald <ben@gwpc.org>
Sent: Wednesday, September 24, 2014 10:56 AM
To: Ben Grunewald; Leslie Savage; Bauer, Robert A; robert.worstall@dnr.state.oh.us; r.hoffman@kcc.ks.gov; austin.holland@ou.edu; Gertson, Rod; Jeff Bull; brian.woodard2@chk.com; Nygaard, Kris J; Timothy_Tyrrell@xtoenergy.com; Linda McDonald; dhenry@hilcorp.com; Dellinger, Philip; Platt, Steve; Bates, William; Scott Anderson; Trenton Cladouhos; Grant Bromhal; Tim Baker; Gerry Baker; Mike Paque; Steele, Edward (GE Global Research); tom.kropatsch@wyo.gov; WRish@hullinc.com; Brad Bacon; Dorsey, Nancy
Subject: RE: "Traffic Light" sub-group...

Good morning Traffic Light Subgroup! AGENDA CHANGE...

We have made a significant modification to the agenda for Seattle that will impact you will...

For a host of reasons, we have made the following changes...

The 4-hour 'closed working session' WAS to be Saturday 1:00-5:00 → will NOW be Sunday Morning from 8:00-12:00

The 4-hour 'open session' WAS to be Sunday Morning from 8:00-12:00 → will NOW be a 1.5 hour session Monday morning from 9:30-11:00

IF YOU WILL NEED TO CHANGE YOUR TRAVEL PLANS → Please let me know if you have added costs and we will attempt to reimburse you for your extra expenses.

I apologize if this messes up previously arranged travel plans and I hope this now works for those who were having difficulty attending the Saturday meeting.

- Again the 'closed working session' is for the regulatory members of the workgroup AND invited professionals... so please decide who needs to be a part of your discussion on Sunday morning.
- PLEASE let me know if you will be able to attend the Seattle sessions..

THANKS – Ben Grunewald
405 516 4972

From: Ben Grunewald
Sent: Tuesday, August 26, 2014 9:49 AM
To: Ben Grunewald; 'Leslie Savage'; 'Bauer, Robert A'; 'robert.worstall@dnr.state.oh.us'; 'r.hoffman@kcc.ks.gov'; 'austin.holland@ou.edu'; 'Gertson, Rod'; 'Jeff Bull'; 'brian.woodard2@chk.com'; 'Nygaard, Kris J'; 'Timothy_Tyrrell@xtoenergy.com'; 'Linda McDonald'; 'dhenry@hilcorp.com'; 'Dellinger, Philip'; 'platt.steve@epa.gov'; 'Bates, William'; 'Scott Anderson'; 'Trenton Cladouhos'; 'Grant Bromhal'; 'Tim Baker'; 'Gerry Baker'; Mike Paque; 'Steele, Edward (GE Global Research)'; 'tom.kropatsch@wyo.gov'; 'WRish@hullinc.com'; 'Brad Bacon'; 'Dorsey.Nancy@epa.gov'
Subject: RE: "Traffic Light" sub-group...

Below are a few items that were communicated before and after the call – PLEASE feel free to add – please see "takeaways" or other details at the end of this email...

From Jeff Bull:

- Objective: develop a framework from which a stop light system could be put in place should one want to (operator or regulator)

- Things to consider:
 - Stop light system is a risk management tool and not intended to be a black and white regulatory tool that determines final definitive action.
 - A “universal” stop light system is not practical because the definition of the hazard and impact necessary to inform a stoplight system varies from play to play on a macro view and within a play (10-20 mile area) from a micro view
 - Stop light system needs to be informed by projection of energy released as it relates to ground motion at the surface that has the potential to cause damage which is dependent upon area geology, characteristics of area faulting, depth of faults, characteristics of the formation into which one is injecting, depth of faults and historic seismicity, predictive modeling for the area of energy released versus level of ground shaking, demographics of area

Feel free to share my thoughts...look forward to hearing how the discussion goes and participating in the future.

Jeff Bull
 Manager Regulatory Operations - MidCon
 Chesapeake Energy Corporation

From Bill Bates
 HI Ben,

Here is a link to an example of a traffic light system for an EPA permit. Granted it is for a Class VI permit, but it is an example none the less.

<http://www.epa.gov/region5/water/uic/adm/pdfs/adm-ccs2-attachment-f-emergency-and-remedial-response-plan-201404.pdf>

It starts on page F7.

 William J. L. Bates
 Geologist
 U.S. EPA
 Office of Ground Water & Drinking Water: Prevention Branch
 202-564-6165

From Nancy Dorsey – EPA Region 6 (Also see attached)

In our NTW draft report we included a number of different considerations broken down as operation, monitoring or management. As the draft was already provided to GWPC after release under FOIA, I clipped the relevant pages and attached them to this email.

An idea that may be worth discussing in Seattle, related to additional information that may be requested under the traffic light model.

If the state agency requests more frequent injection data (daily volumes, with maximum and average pressure). The wells historic data is equally important for two reasons: 1) It potentially allows a view of the wells behavior before area seismicity 2) It shows if there are changes occurring in the wells injectivity response. The latter changes would then need to be viewed along the lines of the age old chicken and the

egg question—which came first, the change in the well behavior or the seismicity. Why is a whole different question, that will take much more information to answer.

With respect to the historic data, using reported injection volumes and pressures filed with the state agency can be used to provide a (relatively) quick look at the wells injectivity pattern. These standard reservoir engineering plots will show if the well flow is linear or more homogeneous and if over time there are changes. State knowledge of other wells injecting in the formation, faults, fractured nature of the formation, etc. is vital to the interpretation, but so is the reporting quality. To be useful for this purpose the annual injection history should be provided at least on a monthly basis, and contain actual data. It is not unusual for some operators to take a short cut when filling out the forms by entering constant pressures and possibly constant volumes. (Yes, wells on a vacuum would correctly be constant 0 pressure.)

(I did not get a direct email, so could not send this to all the Subgroup members.)

Nancy S. Dorsey
Environmental Scientist
Oklahoma Class II Program Manager
WQ-SG EPA Region 6
1445 Ross Ave. #1200
Dallas, TX 75202-2733
214-665-2294
FAX 214-665-2191

Please feel free to add to key points and takeaways...

- 1) Correlation between volume reduction and reduced activity as apposed to pressure reduction (Worstall)**
- 2) 'One size' approach does not work as there are vast geologic variations**
- 3) further develop the concept of process**
- 4) How do you get back to yellow and/or green**
- 5) Threshold parameters need to be discussed for both monitoring and action**
- 6) Assessing and communicating relative risk is key**
- 7) moving from Green to Red is one, thing, BUT moving back to yellow or green, is not well defined**

Ben Grunewald
405 516 4972
Thanks – Ben 405 516 4972